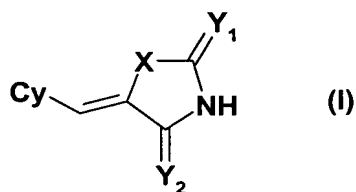


IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): ~~Process~~ A process for improving the fertilization activity of spermatozoa, in particular for increasing spermatozoa motility, comprising the step of treating spermatozoa with a compound of formula (I)



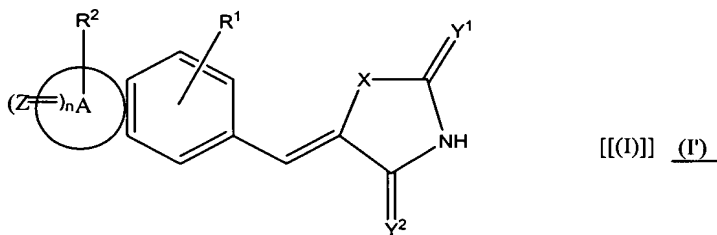
as well as its geometrical isomers, its optically active forms as enantiomers, diastereomers and its racemate forms, as well as pharmaceutically acceptable salts and pharmaceutically active derivatives thereof, wherein

X is S, O or NH;

Y¹ and Y² are independently S, O or -NH;

Cy is a 5 to 8 membered carbocyclic or heterocyclic group may be fused with an aryl, heteroaryl, cycloalkyl or heterocycloalkyl group.

Claim 2 (Currently Amended): ~~Process~~ The process according to claim 1, whereby the compound has formula (I')



A is a 5-8 membered heterocyclic or carbocyclic group, wherein said carbocyclic group may be fused with aryl, heteroaryl, cycloalkyl or heterocycloalkyl;

X is S, O or NH;

Y^1 and Y^2 are independently S, O or -NH;

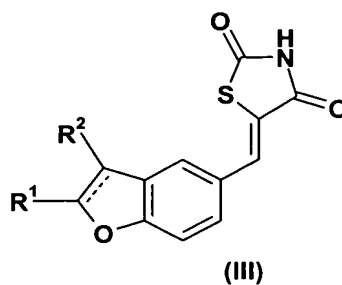
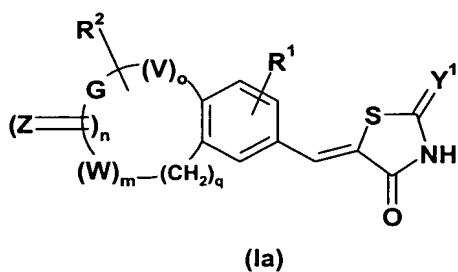
Z is S or O;

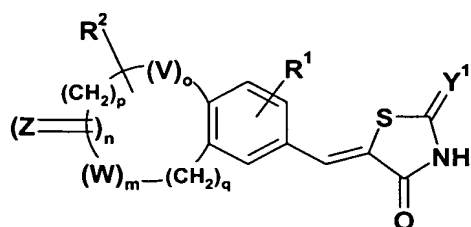
R^1 is H, CN, carboxy, acyl, C_1 - C_6 -alkoxy, halogen, hydroxy, acyloxy, C_1 - C_6 -alkyl carboxy, C_1 - C_6 -alkyl acyloxy, C_1 - C_6 -alkyl alkoxy, alkoxycarbonyl, C_1 - C_6 -alkyl alkoxycarbonyl, aminocarbonyl, C_1 - C_6 -alkyl aminocarbonyl, acylamino, C_1 - C_6 -alkyl acylamino, ureido, C_1 - C_6 -alkyl ureido, amino, C_1 - C_6 -alkyl amino, ammonium, sulfonyloxy, C_1 - C_6 -alkyl sulfonyloxy, sulfonyl, C_1 - C_6 -alkyl sulfonyl, sulfinyl, C_1 - C_6 -alkyl sulfinyl, sulfanyl, C_1 - C_6 -alkyl sulfanyl, sulfonylamino, C_1 - C_6 -alkyl sulfonylamino or carbamate;

R^2 is selected from the group comprising or consisting of H, halogen, acyl, amino, C_1 - C_6 -alkyl, C_2 - C_6 -alkenyl, C_2 - C_6 -alkynyl, C_1 - C_6 -alkyl carboxy, C_1 - C_6 -alkyl acyl, C_1 - C_6 -alkyl alkoxycarbonyl, C_1 - C_6 -alkyl aminocarbonyl, C_1 - C_6 -alkyl acyloxy, C_1 - C_6 -alkyl acylamino, C_1 - C_6 -alkyl ureido, C_1 - C_6 -alkyl amino, C_1 - C_6 -alkyl alkoxy, C_1 - C_6 -alkyl sulfanyl, C_1 - C_6 -alkyl sulfinyl, C_1 - C_6 -alkyl sulfonyl, C_1 - C_6 -alkyl sulfonylaminoaryl, aryl, C_3 - C_8 -cycloalkyl or heterocycloalkyl, C_1 - C_6 -alkyl aryl, C_2 - C_6 -alkenyl-aryl, C_2 - C_6 -alkynyl aryl, carboxy, cyano, hydroxy, C_1 - C_6 -alkoxy, nitro, acylamino, ureido, C_1 - C_6 -alkyl carbamate, sulfonylamino, sulfanyl, or sulfonyl;

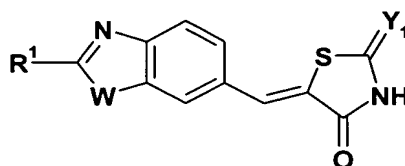
n is 0, 1 or 2;

Claim 3 (Currently Amended): ~~Process~~ The process according to claim 1 or 2, wherein the compound is selected from any of formulae (Ia), (Ib), (Ic) or (Id)

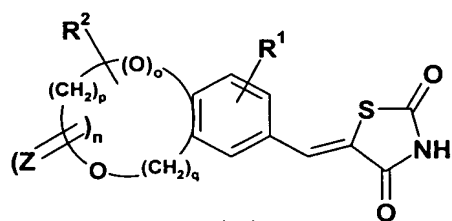




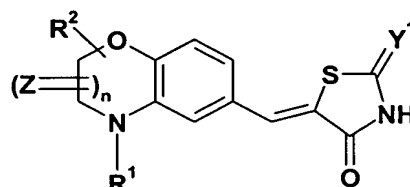
(Ib)



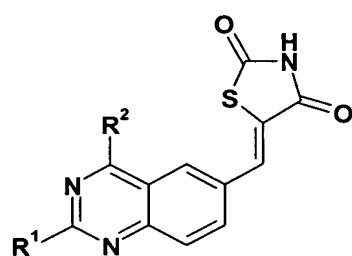
(Ic)



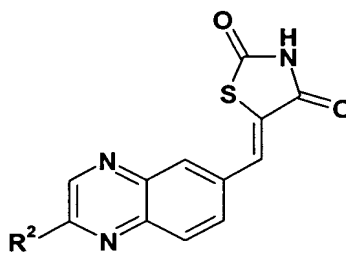
(Id)



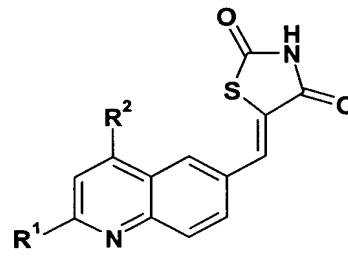
(II)



(IV)



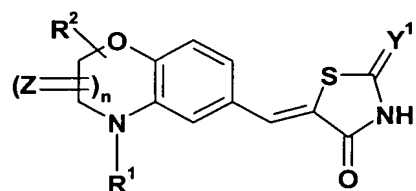
(V)



(VI)

wherein R^1 , R^2 , Y^1 , Z and n are as above-defined, G is a C_1 - C_5 alkylene or a C_1 - C_5 alkenylene group, W and V are each independently from each other selected from O , S , $-NR^3$ wherein R^3 is H or a C_1 - C_6 alkyl group, m , n and o are each independently from each other 0 or 1, p and q are independently from each other an integer from 1 to 4.

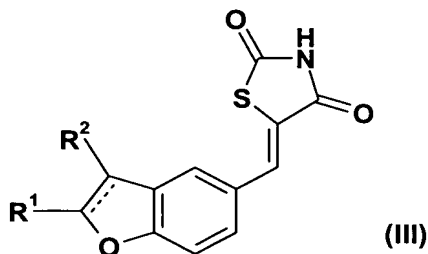
Claim 4 (Currently Amended): ~~Process~~ The process according to ~~any of the preceding claims~~ claim 1, wherein the compound has formula (II)



(II)

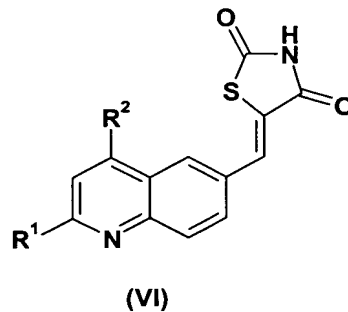
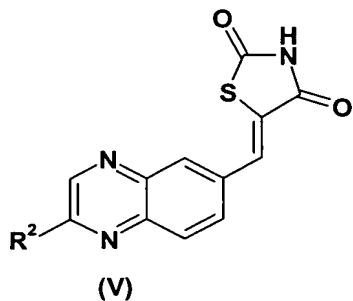
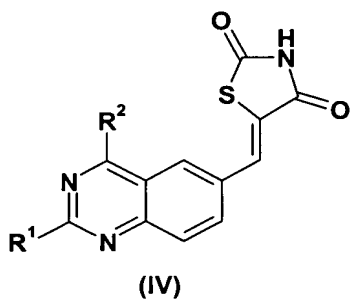
wherein Z , Y^1 , R^1 , R^2 are as above defined; n is 0 or 1.

Claim 5 (Currently Amended): ~~Process The process~~ according to ~~any of claims 1 to 3~~ claim 1, wherein the compound has formula (III)



wherein R^1 and R^2 are as above defined.

Claim 6 (Currently Amended): ~~Process The process~~ according to ~~any of claims 1 to 3~~ claim 1, wherein the compound has any of formulae (IV), (V) or (VI);



wherein R^1 and R^2 are as above defined.

Claim 7 (Currently Amended): ~~Process The process~~ according to ~~any of claims 1 to 6~~ claim 1, wherein treating the spermatozoa with the compound of formula (I) is performed on seminal liquid comprising the spermatozoa.

Claim 8 (Currently Amended): ~~Process The process~~ according to ~~any of claims 1 to 7~~ claim 1, further comprising separating the spermatozoa by spermatozoa separation methods used in assisted reproduction techniques.

Claim 9 (Currently Amended): ~~Process~~ The process according to claim 8, wherein separating the spermatozoa is performed by a method selected from the wash and spin method, the sedimentation method, the direct swim-up method, the pellet and swim-up method, the buoyant density gradient method.

Claim 10 (Currently Amended): ~~Process~~ The process according to claim 9, wherein separating the spermatozoa is performed by the direct swim-up method.

Claim 11 (Currently Amended): ~~Process~~ The process according to ~~any of the preceding claims~~ claim 1, wherein the process is performed on mammal spermatozoa, in particular on human spermatozoa.

Claim 12 (Currently Amended): ~~Process~~ The process according to ~~any of the preceding claims~~ claim 1, wherein the compound of formula (I) is selected from the group consisting of :

5-(1,3-benzodioxol-5-ylmethylene)-1,3-thiazolidine-2,4-dione

5-(1,3-benzodioxol-5-ylmethylene)-2-thioxo-1,3-thiazolidin-4-one

5-(2,3-dihydro-1,4-benzodioxin-6-ylmethylene)-1,3-thiazolidine-2,4-dione

5-(2,3-dihydro-1-benzofuran-5-ylmethylene)-1,3-thiazolidine-2,4-dione

5-[(7-methoxy-1,3-benzodioxol-5-yl)methylene]-1,3-thiazolidine-2,4-dione

5-[(9,10-dioxo-9,10-dihydroanthracen-2-yl)methylene]-1,3-thiazolidine-2,4-dione

5-[(2,2-difluoro-1,3-benzodioxol-5-yl)methylene]-1,3-thiazolidine-2,4-dione

(5Z)-5-(1,3-dihydro-2-benzofuran-5-ylmethylene)-1,3-thiazolidine-2,4-dione

5-(1-benzofuran-5-ylmethylene)-1,3-thiazolidine-2,4-dione

5-[(4-methyl-3-oxo-3,4-dihydro-2H-1,4-benzoxazin-6-yl)methylene]-1,3-thiazolidine-2,4-dione

5-(1,3-benzodioxol-5-ylmethylene)-2-imino-1,3-thiazolidin-4-one

5-Quinolin-6-ylmethylene-thiazolidine-2,4-dione

5-Quinolin-6-ylmethylene-2-thioxo-thiazolidin-4-one

2-Imino-5-quinolin-6-ylmethylene-thiazolidin-4-one

5-(3-Methyl-benzo[d]isoxazol-5-ylmethylene)-thiazolidine-2,4-dione

5-(4-Phenyl-quinazolin-6-ylmethylene)-thiazolidine-2,4-dione

5-(4-Dimethylamino-quinazolin-6-ylmethylene)-thiazolidine-2,4-dione

5-[(4-aminoquinazolin-6-yl)methylene]-1,3-thiazolidine-2,4-dione

5-[(4-piperidin-1-ylquinazolin-6-yl)methylene]-1,3-thiazolidine-2,4-dione

5-[(4-morpholin-4-ylquinazolin-6-yl)methylene]-1,3-thiazolidine-2,4-dione

5-{{4-(benzylamino)quinazolin-6-yl}methylene}-1,3-thiazolidine-2,4-dione

5-{{4-(diethylamino)quinazolin-6-yl}methylene}-1,3-thiazolidine-2,4-dione

5-{{4-[(pyridin-2-ylmethyl)amino]quinazolin-6-yl}methylene}-1,3-thiazolidine-2,4-dione

5-{{4-[(pyridin-3-ylmethyl)amino]quinazolin-6-yl}methylene}-1,3-thiazolidine-2,4-dione

ethyl 1-{6-[(2,4-dioxo-1,3-thiazolidin-5-ylidene)methyl]quinazolin-4-yl}piperidine-3-carboxylate

ethyl 1-{6-[(2,4-dioxo-1,3-thiazolidin-5-ylidene)methyl]quinazolin-4-yl}piperidine-4-carboxylate

tert-butyl 1-{6-[(2,4-dioxo-1,3-thiazolidin-5-ylidene)methyl]quinazolin-4-yl}-L-prolinâ

5-{{4-(4-methylpiperazin-1-yl)quinazolin-6-yl}methylene}-1,3-thiazolidine-2,4-dione

5-{{4-(4-pyrimidin-2-ylpiperazin-1-yl)quinazolin-6-yl}methylene}-1,3-thiazolidine-2,4-dione

5-({4-[4-(4-fluorophenyl)piperidin-1-yl]quinazolin-6-yl}methylene)-1,3-thiazolidine-2,4-dione

5-{{4-(4-benzylpiperidin-1-yl)quinazolin-6-yl}methylene}-1,3-thiazolidine-2,4-dione

5-({4-[4-(2-phenylethyl)piperidin-1-yl]quinazolin-6-yl}methylene)-1,3-thiazolidine-2,4-dione

5-{{4-(4-methylpiperidin-1-yl)quinazolin-6-yl}methylene}-1,3-thiazolidine-2,4-dione

5-{{4-(4-hydroxypiperidin-1-yl)quinazolin-6-yl}methylene}-1,3-thiazolidine-2,4-dione

1-[6-(2,4-Dioxo-thiazolidin-5-ylidenemethyl)-quinazolin-4-yl]-piperidine-4-carboxylic acid

1-[6-(2,4-Dioxo-thiazolidin-5-ylidenemethyl)-quinazolin-4-yl]-piperidine-3-carboxylic acid

1-[6-(2,4-Dioxo-thiazolidin-5-ylidenemethyl)-quinazolin-4-yl]-pyrrolidine-2-carboxylic acid

5-(4-Methylamino-quinazolin-6-ylmethylene)-thiazolidine-2,4-dione

5-(4-Methoxy-quinazolin-6-ylmethylene)-thiazolidine-2,4-dione

2-Imino-5-(4-methylamino-quinazolin-6-ylmethylene)-thiazolidin-4-one

2-Imino-5-(4-piperidine-quinazolin-6-ylmethylene)-thiazolidin-4-one

2-Imino-5-(4-dimethylamino-quinazolin-6-ylmethylene)-thiazolidin-4-one

5-(2-Methyl-2H-benzotriazol-5-ylmethylene)-thiazolidine-2,4-dione

5-(3-Methyl-3H-benzotriazol-5-ylmethylene)-thiazolidine-2,4-dione

5-(3-Ethyl-3H-benzoimidazol-5-ylmethylene)-thiazolidine-2,4-dione

5-{{1-(4-phenylbutyl)-1H-benzimidazol-6-yl}methylene}-1,3-thiazolidine-2,4-dione

5-[(1-prop-2-yn-1-yl-1H-benzimidazol-6-yl)methylene]-1,3-thiazolidine-2,4-dione

5-[(1-{2-[4-(trifluoromethyl)phenyl]ethyl}-1H-benzimidazol-6-yl)methylene]-1,3-thiazolidine-2,4-dione

5-({1-[2-(4-hydroxyphenyl)ethyl]-1H-benzimidazol-6-yl}methylene)-1,3-thiazolidine-2,4-dione

methyl 4-{6-[(2,4-dioxo-1,3-thiazolidin-5-ylidene)methyl]-1H-benzimidazol-1-yl}cyclohexanecarboxylate

5-({1-[2-(5-methoxy-1H-indol-3-yl)ethyl]-1H-benzimidazol-6-yl}methylene)-1,3-thiazolidine-2,4-dione

5-({1-[(1-methyl-1H-pyrazol-4-yl)methyl]-1H-benzimidazol-6-yl}methylene)-1,3-thiazolidine-2,4-dione

5-({1-[2-(3,4-dimethoxyphenyl)ethyl]-1H-benzimidazol-6-yl}methylene)-1,3-thiazolidine-2,4-dione

5-({1-[2-(4-phenoxyphenyl)ethyl]-1H-benzimidazol-6-yl}methylene)-1,3-thiazolidine-2,4-dione

5-({1-[4-(trifluoromethyl)benzyl]-1H-benzimidazol-6-yl}methylene)-1,3-thiazolidine-2,4-dione

4-{6-[(2,4-dioxo-1,3-thiazolidin-5-ylidene)methyl]-1H-benzimidazol-1-yl}cyclohexanecarboxylic acid

5-[(1-isobutyl-1H-benzimidazol-6-yl)methylene]-1,3-thiazolidine-2,4-dione

5-({1-[2-(1,3-benzodioxol-4-yl)ethyl]-1H-benzimidazol-6-yl}methylene)-1,3-thiazolidine-2,4-dione

5-({1-[2-(2-phenoxyphenyl)ethyl]-1H-benzimidazol-6-yl}methylene)-1,3-thiazolidine-2,4-dione

5-[[1-(3,3-diphenylpropyl)-1H-benzimidazol-6-yl]methylene]-1,3-thiazolidine-2,4-dione

5-[[1-(2-methoxybenzyl)-1H-benzimidazol-6-yl]methylene]-1,3-thiazolidine-2,4-dione

5-[[1-(3-furylmethyl)-1H-benzimidazol-6-yl]methylene]-1,3-thiazolidine-2,4-dione

5-[(1-propyl-1H-benzimidazol-6-yl)methylene]-1,3-thiazolidine-2,4-dione

5-Quinoxalin-6-ylmethylene-thiazolidine-2,4-dione

5-Quinoxalin-6-ylmethylene-2-thioxo-thiazolidin-4-one

2-Imino-5-quinoxalin-6-ylmethylene-thiazolidin-4-one

5-Benzothiazol-6-ylmethylene-thiazolidine-2,4-dione

5-(3-Methyl-benzofuran-5-ylmethylene)-thiazolidine-2,4-dione

5-(2-Bromo-3-methyl-benzofuran-5-ylmethylene)-thiazolidine-2,4-dione

5-(3-bromo-benzofuran-5-ylmethylene)-thiazolidine-2,4-dione

3-[5-(2,4-Dioxo-thiazolidin-5-ylidenemethyl)-benzofuran-3-yl]-acrylic acid ethyl ester

3-[5-(2,4-Dioxo-thiazolidin-5-ylidenemethyl)-benzofuran-3-yl]-acrylic acid

5-[3-(3-Oxo-3-piperidin-1-yl-propenyl)-benzofuran-5-ylmethylene]-thiazolidine-2,4-dione

Methyl 1-((3-{5-[(2,4-dioxo-1,3-thiazolidin-5-ylidene)methyl]-1-benzofuran-3-yl}prop-2-enoyl)prolinate

Methyl 1-((3-{5-[(2,4-dioxo-1,3-thiazolidin-5-ylidene)methyl]-1-benzofuran-3-yl}prop-2-enoyl)-D-prolinate

(5-({3-[(3-oxo-3-pyrrolidin-1-ylprop-1-en-1-yl)-1-benzofuran-5-yl]methylene)-1,3-thiazolidine-2,4-dione

5-({3-[3-morpholin-4-yl-3-oxoprop-1-en-1-yl]-1-benzofuran-5-yl}methylene)-1,3-thiazolidine-2,4-dione

Methyl 1-(3-{5-[(2,4-dioxo-1,3-thiazolidin-5-ylidene)methyl]-1-benzofuran-3-yl}prop-2-enoyl)-L-prolinate

N-cyclohexyl-3-{5-[(2,4-dioxo-1,3-thiazolidin-5-ylidene)methyl]-1-benzofuran-3-yl}-N-methylacrylamide

3-{5-[(2,4-dioxo-1,3-thiazolidin-5-ylidene)methyl]-1-benzofuran-3-yl}-N-ethyl-N-(2-hydroxyethyl)acrylamide

N-cyclobutyl-3-{5-[(2,4-dioxo-1,3-thiazolidin-5-ylidene)methyl]-1-benzofuran-3-yl}acrylamide

5-({3-[3-azetidin-1-yl-3-oxoprop-1-en-1-yl]-1-benzofuran-5-yl}methylene)-1,3-thiazolidine-2,4-dione

5-({3-[3-(1,3-dihydro-2H-isoindol-2-yl)-3-oxoprop-1-en-1-yl]-1-benzofuran-5-yl}methylene)-1,3-thiazolidine-2,4-dione

5-({3-[3-azepan-1-yl-3-oxoprop-1-en-1-yl]-1-benzofuran-5-yl}methylene)-1,3-thiazolidine-2,4-dione

3-{5-[(2,4-dioxo-1,3-thiazolidin-5-ylidene)methyl]-1-benzofuran-3-yl}-N-piperidin-1-ylacrylamide

3-{5-[(2,4-dioxo-1,3-thiazolidin-5-ylidene)methyl]-1-benzofuran-3-yl}-N-(pyridin-3-ylmethyl)acrylamide

N-cyclohexyl-3-{5-[(2,4-dioxo-1,3-thiazolidin-5-ylidene)methyl]-1-benzofuran-3-yl}acrylamide

5-({3-[3-(4-methylpiperazin-1-yl)-3-oxoprop-1-en-1-yl]-1-benzofuran-5-yl}methylene)-1,3-thiazolidine-2,4-dione

N-cycloheptyl-3-{5-[(2,4-dioxo-1,3-thiazolidin-5-ylidene)methyl]-1-benzofuran-3-yl}acrylamide

5-({3-[3-(2,5-dihydro-1H-pyrrol-1-yl)-3-oxoprop-1-en-1-yl]-1-benzofuran-5-yl}methylene)-1,3-thiazolidine-2,4-dione

N-cyclopentyl-3-{5-[(2,4-dioxo-1,3-thiazolidin-5-ylidene)methyl]-1-benzofuran-3-yl}acrylamide

3-[5-(2,4-Dioxo-thiazolidin-5-ylidenemethyl)-benzofuran-3-yl]-propionic acid ethyl ester

3-[5-(2,4-Dioxo-thiazolidin-5-ylidenemethyl)-benzofuran-3-yl]-propionic acid
5-[3-(3-Oxo-3-piperidin-1-yl-propyl)-benzofuran-5-ylmethylene]-thiazolidine-2,4-dione

6-(2,4-Dioxo-thiazolidin-5-ylidenemethyl)-2,3-dihydro-benzo[1,4]oxazine-4-carboxylic acid tert-butyl ester

5-(3,4-Dihydro-2H-benzo[1,4]oxazin-6-ylmethylene)-thiazolidine-2,4-dione
5-(4-Benzoyl-3,4-dihydro-2H-benzo[1,4]oxazin-6-ylmethylene)-thiazolidine-2,4-dione

5-(4-Acetyl-3,4-dihydro-2H-benzo[1,4]oxazin-6-ylmethylene)-thiazolidine-2,4-dione
6-(2,4-Dioxo-thiazolidin-5-ylidenemethyl)-benzo[1,4]oxazine-4-carboxylic acid tert-butyl ester

[6-(2,4-Dioxo-thiazolidin-5-ylidenemethyl)-3-oxo-2,3-dihydro-benzo[1,4]-oxazin-4-yl]-acetic acid methyl ester

N-Benzyl-2-[6-(2,4-dioxo-thiazolidin-5-ylidenemethyl)-3-oxo-2,3-dihydro-benzo[1,4]oxazin-4-yl]-acetamide

5-(4-Butyl-3-oxo-3,4-dihydro-2H-benzo[1,4]oxazin-6-ylmethylene)-thiazolidine-2,4-dione

5-(4-Benzyl-3-oxo-3,4-dihydro-2H-benzo[1,4]oxazin-6-ylmethylene)-thiazolidine-2,4-dione

5-(2-Chloro-benzofuran-5-ylmethylene)-thiazolidine-2,4-dione

5-(3-Amino-benzo[d]isoxazol-5-ylmethylene)-thiazolidine-2,4-dione

5-(3-Phenylethynyl-benzofuran-5-ylmethylene)-thiazolidine-2,4-dione

5-Benzo[1,2,5]thiadiazol-5-ylmethylene-thiazolidine-2,4-dione

5-Benzo[1,2,5]oxadiazol-5-ylmethylene-thiazolidine-2,4-dione

5-(2-Methyl-benzofuran-6-ylmethylene)-thiazolidine-2,4-dione

5-(2-Carboxymethyl-benzofuran-6-ylmethylene)-thiazolidine-2,4-dione

5-(3-Bromo-2-fluoro-2,3-dihydro-benzofuran-6-ylmethylene)-thiazolidine-2,4-dione

5-(2-Fluoro-benzofuran-6-ylmethylene)-thiazolidine-2,4-dione

Claim 13 (Currently Amended): ~~Process~~ The process according to ~~any of the preceding claims~~ claim 1, wherein said spermatozoa are treated with an amount of a compound of formula (I) in the range of about 0.01 to 1000 μM , about 5 to 500 μM , or about 10 to 100 μM .

Claim 14 (Currently Amended): ~~Process~~ The process according to ~~any of the preceding claims~~ claim 1, wherein treating the spermatozoa with a compound of formula (I) comprises incubating the spermatozoa for a period of time in the range of about 30 minutes to 10 hours or about 1 to 8 hours or about 2 to 6 hours at a temperature of around 37°C.

Claim 15 (Currently Amended): Spermatozoa ~~obtainable~~ obtained by the process according to ~~any of claims 1 to 14~~ claim 1.

Claim 16 (Currently Amended): ~~Use of a compound according to formula (I)~~ A method for improving the fertilization rate in assisted reproduction techniques comprising utilizing a compound of formula (I) in assisted reproduction techniques.

Claim 17 (Currently Amended): Use The method according to claim [[14]] 16, wherein the assisted reproduction techniques are selected from in vitro fertilization (IVF), gamete intrafallopian transfer (GIFT), or intra-uterine insemination (IUI).

Claim 18 (Currently Amended): ~~Use of a compound according to formula (I)~~ A method for the preparation of a pharmaceutical composition for the treatment of infertility comprising adding a compound of formula (I) to a pharmaceutical composition , ~~in particular male infertility.~~

Claim 19 (Currently Amended): ~~Use of a compound according to any of formula (I)~~ A method for the preparation of a pharmaceutical composition for improving spermatozoa fertilization activity, ~~in particular for increasing spermatozoa motility~~ comprising adding a compound of formula (I) to a pharmaceutical composition.

Claim 20 (Currently Amended): ~~Method~~ A method of ART therapy, comprising treating spermatozoa with a compound of ~~any of formulae~~ formula (I) ~~as above defined.~~

Claim 21 (Currently Amended): ~~Method~~ A method according to claim 20, wherein said ART therapy is ~~are~~ selected from the group consisting of in vitro fertilization (IVF), gamete intrafallopian transfer (GIFT), or intra-uterine insemination (IUI).

Claim 22 (Currently Amended): A medium for storage and/or transportation of spermatozoa comprising a compound ~~of any~~ of formula (I).

Claim 23 (Currently Amended): ~~Medium~~ The medium according to claim 22 for the storage and/or transportation of mammal spermatozoa, ~~in particular human spermatozoa.~~

Claim 24 (Currently Amended): ~~Medium~~ The medium according to ~~any of claims 22 or 23~~ claim 22, comprising an amount of a compound of formula (I) in the range of about 0.01 to 1000 μM , about 5 to 500 μM , or about 10 to 100 μM .

Claim 25 (New): The method according to claim 18 wherein said treatment of infertility is treatment of male infertility.

Claim 26 (New): The method according to claim 19 wherein said improving spermatozoa fertilization activity is increasing spermatozoa motility.

Claim 27 (New): The medium according to Claim 23 wherein the mammal spermatozoa is human spermatozoa.